REMARKS

Receipt of the Office Action of July 13, 2009 is gratefully acknowledged.

Claims 8 and 10 - 14 have been re-examined and rejected as follows: claims 8, 10, 11, 13 and 14 under 35 USC 103(a) over Brutschin in view of Lopatin; and claim 12 under 35 USC 103(a) over Brutschin in view of Lopatin and Lewiner.

These rejections are respectfully traversed.

As stated correctly by the examiner, Brutschin does not teach that the disk-shaped piezoelectric element has two segments which are essentially polarized oppositely to one another. Neither does he teach that the two segments are connected in series, nor that exactly two electrodes of opposite polarity are applied to said piezoelectric element.

Brutschin's disk-shaped piezoelectric element has four segments because it is divided into a transmitting unit and a receiving unit, each containing two segments and two electrodes. In contrast, the two segments according to the present invention are a transmitting and receiving unit at the same time.

Another difference between Brutschin and the present invention arises if one considers the electrical contacts of the segments shown in Figs. 3 and 6. According to Brutschin, an inverter has to be provided that inverts the signal applied to one of the two transmitting electrodes [claim 5]. The inventive two-segmented piezoelectric element, of the present invention, does not need an inverter. Therefore, a person skilled in the art having knowledge of the device disclosed by Brutschin would not, it is respectfully submitted, consider the present invention as being obvious in view of Brutschin taken alone.

The piezoelectric drive disclosed by Lopatin is not even an equivalent of the piezoelectric drive according to the present invention. Applicant cannot agree with the examiner that the two segments of the piezoelectric element of Lopatin are connected in series, as are the two segments according to the present invention. The two oppositely charged electrodes are electrically connected with one another [see paragraph 15], or in other words short-circuited. Therefore, the piezoelectric element acts in a quite different way from that of the inventive piezoelectric element, as is stated e.g. in claims 42 and 43 of Lopatin, "the force components of the movement (of the mechanically oscillatable unit) are essentially opposite to one another" and "the force components are ones of push and pull, and the movement is a wagging movement or rotary movement". If a voltage is applied to the electrically conductive components then the stack contracts on the one side and expands on the other, as is stated in paragraph 50. The result is a wagging motion. The same holds for a single piezoelectric element instead of a stack.

If the piezoelectric element is used as a receiving unit, voltage induced by forces acting on the piezoelectric element is detected. As can be seen in Fig. 7, only one force distribution leads to a signal in the piezoelectric element. This distribution is the push force acting on one segment and the pull force acting on the other one.

The piezoelectric element according to the present invention does not experience or perform push and pull forces. The two segments are connected in series and contract and expand synchronously. The principle of excitation of the membrane and the oscillatable unit that is secured to the membrane therefore differs very significantly from the one disclosed by Lopatin. This can clearly be seen by comparing e.g. Fig. 15 of Lopatin and Fig. 2 of the present invention, both showing the two rods of a tuning fork and the piezoelectric drive. While Lopatin provides two drives, one for each rod, the invention needs only one drive,

placed in the center of the membrane in the middle of the two rods.

Hence, the invention would not, it is respectfully submitted, be obvious to a person skilled in the art by combining Brutschin and Lopatin.

Regarding Lewiner, it is true that claim 12 of the present invention does not claim that the electrodes are directly applied to a membrane. But it does claim that the electrodes are oppositely charged. As claim 12 refers to claim 8, the electrodes mentioned in claim 12 that are so structured and arranged that they annularly surround themselves have all the features the electrodes introduced in claim 8 have and therefore are of opposite polarity.

Even if the electrodes are not applied directly to a membrane, but to a piezoelectric element that is secured to a membrane, the difference in scope of the electrodes according to the present invention and according to Lewiner remains clear. The electrodes disclosed in the present invention provide a voltage that causes the piezoelectric element to exercise motion and thereby driving an oscillatable unit. The device disclosed by Lewiner contains electrodes that are neither connected to a piezoelectric element nor to any other device that can be considered to be a drive or a device that applies force to another element. They are measuring electrodes.

Therefore it is clear that the electrodes differ totally in scope and field of endeavour, and Lewiner is not really relevant if one tries to find a special arrangement of electrodes for contacting a piezoelectric element

Claim 8 has been further amended to clarify the invention recited, and in view of the amendment and the comments made above, it is believed that claims 8 and 10 - 14 are allowed.

Respectfully submitted,
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